

**NEW JERSEY
DEPARTMENT OF TRANSPORTATION**



**AMWELL ROAD (CR 514) BRIDGE OVER
NESHANIC RIVER
STRUCTURE NO. B0507
HILLSBOROUGH TOWNSHIP
SOMERSET COUNTY**

PRELIMINARY DESIGN TEXT SUBMISSION

DECEMBER 2002



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AMWELL ROAD (CR 514) BRIDGE OVER NESHANIC RIVER STRUCTURE NO. B0507 HILLSBOROUGH TOWNSHIP SOMERSET COUNTY

I. PROJECT DESCRIPTION:

The project consists of the replacement of the existing bridge over the Neshanic River (Structure No. B0507). The existing bridge is a two-span, concrete, spandrel-filled arch supported by concrete abutments and pier. The bridge was built circa 1900. The bridge is deteriorated, structurally deficient and in need of replacement. The bridge accommodates one lane in each direction with no shoulders and a 7.3 m clear roadway width.

Amwell Road is considered a Major Rural Collector and is designated as Somerset County Route 514. Amwell Road links New Brunswick, Millstone and Ringoes and also provides access to Flemington. Within the project limits, Amwell Road is a two-lane road consisting of a variable width roadway of 6.1 m to 7 m with variable width shoulders of 0.6 to 1.8 m. The road is posted with a 40 mph speed limit. Speed reduction of 30 mph is posted at the east approach to the bridge because the existing horizontal alignment is inadequate for the posted 40 mph speed limit. The alignment consists of a straight approach from the west and across the bridge and a tight, substandard curve just east of the bridge. The bridge is located on a crest curve with sag curves on both approaches. The vertical geometry is substandard for the posted speed.

The project consists of replacing the bridge and improving roadway geometrics on an alignment that minimizes right-of-way acquisitions and environmental impacts. The new structure will conform to applicable NJDEP permitting requirements. The project is situated in a historic district; however, the bridge is not considered to be eligible for National Register of Historic Places. The project limits begin just east of the Amwell Road/Montgomery Road/Black Point Road intersection and end approximately 160 meters east of the centerline of the Neshanic River. Within the project limits, the proposed vertical and horizontal alignment of Amwell Road will be improved to satisfy minimum design criteria for a design speed of 70 km/h in accordance with Somerset County standards. The roadway and bridge will be designed for two 3.6-m lanes and two 2.4-m shoulders.

II. PUBLIC / COMMUNITY INVOLVEMENT:

Two public officials briefings were held during Preliminary Design on June 21, 2002 and November 15, 2002. The local stakeholders for the project are Hillsborough Township and Somerset County.



At the first meeting, the Mayor of Hillsborough Township, Joseph Tricarico Jr., was present along with representatives from NJDOT. At the second meeting, Mayor Joseph Tricarico, Somerset County Engineer Rich Grocholski and representatives from NJDOT were present. There was general concern from the municipality in regard to the possible widening of the roadway and lifting of weight limits on County Route 514 (currently the bridge does not have any weight restrictions), removal of trees, and the detour route during construction. The County has expressed the need to replace the deteriorated bridge and supports the project. A public information center will be held early on in final design to receive additional input on the project.

III. ENVIRONMENTAL DOCUMENTATION:

Due to the fact that the number of through lanes will not increase on the bridge and that the proposed alignment is very similar to the existing alignment, a NJDOT Categorical Exclusion Document (CED) applies. NJDOT has completed the CED in-house with assistance from Arora and Arora's subconsultants Amy S. Green Environmental Consultants and Richard Grubb and Associates.

Wetland delineation was completed by Arora's subconsultant, Amy S. Green Environmental Consultants, Inc. (ASGEC) and a Letter of Interpretation from NJDEP confirming the location of the wetlands and State open waters has been obtained for the project area. Retaining walls are proposed to the west of the bridge to minimize impacts to the existing drainage patterns and wetlands.

Richard Grubb and Associates (RGA) performed a cultural resources investigation for archaeology and architecture within the Area of Potential Effects (Cultural Resources Investigation Report, February 2002). A historic archaeological site (Suydam/Hall workshop) was found to the east of the bridge within the Amwell Road right-of-way and extending into the property at 789 Amwell Road. Also, two properties within the project limits were considered eligible for inclusion in the National Register of Historic Places. The report concludes that the proposed project will have an effect that is not adverse on these cultural resources. NJDOT has received concurrence from the SHPO on this conclusion on May 1, 2002. Phase II Fieldwork was completed by RGA in the vicinity of the historical archaeological site during Preliminary Design, and several artifacts were unearthed and documented.

Prestige Environmental conducted a hazardous waste screening (Hazardous Waste Screening Report, March 17, 2000) in the project area. Overall, the study did not find significant recognized environmental conditions in the vicinity of the project that would warrant additional investigation. Automobile battery casings have been observed in the southeast corner of the intersection of Amwell Road and Black Point Road. ASGEC recommends off-site disposal of the battery casings and site assessment.

This project will require an NJDEP Stream Encroachment Permit (SEP) and General Wetland Permit #10. Additional environmental findings and conclusions can be found in the CED attached to this report.



IV. DESIGN CRITERIA:

A. Roadway Design Criteria

- a. Functional Classification – Rural Major Collector
- b. Design Speed – 70 km/h (45 mph)
- c. Design Vehicle – Semitrailer Large WB-15 (WB-50)
- d. Maximum Superelevation Rate – 4% (As per Somerset County design standards)
- e. English/Metric Design - Metric

B. Traffic Design Criteria

| | <u>Construction Year (2005)</u> | <u>Design Year (2025)</u> |
|------------|---------------------------------|---------------------------|
| a. ADT | 6500 vpd (two-way) | 10000 vpd (two-way) |
| b. DHV | 975 vph (two-way) | 1500 vpd (two-way) |
| c. DD | 50% | 50% |
| d. %Trucks | 10% | 10% |
| e. LOS | B | C |

C. Bridge Design Criteria

- a. Design Loading HL-93
- b. Operational Importance Factor 1.00
- c. Seismic Bridge Classification SPC B
- d. Vessel Impact Classification NA
- e. Underclearances
 - i. Highway NA
 - ii. Railroad NA
 - iii. Waterway approx. 3.0 m

D. Pavement Design Criteria

- a. Traffic Volumes - 3250 vpd (one-way 2005), 5000 vpd (one-way 2025)
- b. % of Light and Heavy Trucks - 20%
- c. 18 kip Load Equivalency Factors (Heavy Trucks) - Flexible-1.200, Rigid-2.100
- d. Life Cycle – 20 years
- e. Directional and Lane Distribution Factors – 50%

E. Construction Specifications

- a. Standard 2001 Metric

V. DESIGN STANDARDS:

A. AASHTO –except where superceded by NJDOT standards

- 1. A Policy on Geometric Design of Highways and Streets
- 2. Highway Definitions



3. Roadside Design Guide
4. AASHTO Guide for the Design of Pavement Structures
5. AASHTO – An Informational Guide for Roadway Lighting
6. AASHTO LRFD Bridge Design Specifications
7. AASHTO Standard Specifications for Highway Bridges
8. AASHTO Manual on Foundation Investigations
9. AASHTO/AWS Bridge Welding Code

B. NJDOT

1. Roadway Design Manual
2. Bridges & Structures Design Manual
3. Road User Cost Manual
4. Survey Manual
5. Access Management Code
6. Guideline: Designer Requirements for Revocations, Modifications and Adjustments of Access, dated April 2001, Office of Access Design
7. Maintenance Manual
8. Pavement Design Manual (AASHTO Companion)
9. Soil Erosion and Sediment Control Standards
10. Standard Specifications for Road and Bridge Construction
11. Electrical Material Specifications
12. Standard Roadway Construction/Traffic Control/ Electrical/Bridge Construction Details
13. Sample Plans
14. CADD Manual
15. Context Sensitive Design Policy – Document #2001-13, October 4, 2001
16. Context Sensitive Design Training Manual
17. Procedures Manual
18. Construction Schedule Manual
19. Utility Accommodation Policy
20. Right-of-way Manual

C. OTHERS

1. TRB Highway Capacity Manual
2. Manual on Uniform Traffic Control Devices
3. ITE Handbook
4. American Society for Testing and Materials (ASTM)
5. FHWA Federal-Aid Policy Guide (FAPG)
6. NJDEP Technical Manual for Stream Encroachment Permits
7. HEC-1, Flood Hydrograph Package
8. HEC-RAS, River Analysis System
9. HEC-18 Evaluating Scour at Bridges
10. HEC-20 Stream Stability of Highway Structures

11. HEC-23 Bridge Scour and Stream Instability Countermeasures
12. TR-55, Urban Hydrology for Small Watersheds
13. American Standard for Nursery Stock, American Association of Nurserymen, Inc.
14. Hortus III

VI. DESIGN ELEMENTS:

A. Geometrics

The proposed alignment and profile was developed to minimize impacts to existing properties and wetlands. To the east of the bridge, there will be a fill area that is required to eliminate an existing substandard vertical curve. One 3.6-m lane in each direction and 2.4-m shoulders are proposed throughout the limits of the project to meet minimum NJDOT requirements. On the west end of the project, a superelevated section will be developed to match the existing section just east of the Amwell Road / Montgomery Road / Black Point Road intersection. Retaining walls are proposed west of the bridge to minimize impacts to the drainage patterns and wetlands. East of the bridge, a 4% maximum superelevation will be used on the curve in accordance with Somerset County design standards.

B. Pavement Engineering

Amwell Road in the vicinity of the bridge has a bituminous overlay that is in fair condition with some longitudinal, transverse and edge cracks. No surface rutting or wheel path distress was observed. Four pavement cores and fifteen soil borings were taken during Preliminary Design and have revealed that there is a flexible pavement box beneath the existing overlay. The existing pavement box thickness appears adequate for the existing traffic conditions. The existing pavement consists of approximately 200 mm thick of bituminous concrete surface and base course, a 150 mm dense aggregate base course and an adequate subbase beneath the dense aggregate base course.

The improvement of Amwell Road will consist of stripping and embankment construction in the widened areas. The subsurface investigation has indicated the presence of a fill layer over natural alluvial deposits. The fill layer can be considered as fair to good for pavement support and drainage. A thin alluvial deposit layer exists on top of predominately shale bedrock. Based on the subsurface information, roadway embankment can be constructed on existing ground after stripping without appreciable settlement. Milling and resurfacing of the existing pavement will be required where grade changes are small. The pavement box will be replaced or constructed where required by grade changes.

Traffic and truck volumes on Amwell Road are high for a rural collector. Traffic data was obtained from the NJDOT. Further investigation of the pavement conditions along the proposed detour may be required during final design.



C. Structural Design

The existing two-span bridge carrying Amwell Road over the Neshanic River (Structure No. B0507) is structurally deficient and will be replaced. The bridge is located within a delineated floodway. A HEC-RAS analysis was performed during preliminary design to verify that the proposed bridge opening meets NJDEP's criteria of not affecting existing river flood levels. The bridge is proposed to be a two-span, continuous, steel beam structure with a total bridge length of 39 meters and bridge width of 12.9 meters. The abutments and piers will be constructed on spread foundations and will be of a conventional type. A two-span option was chosen over a one-span option to minimize structural depth. A scour analysis was performed during preliminary design and revealed that the streambed is stable. Some local scour is expected at the pier and riprap will be placed around the pier foundation.

During Preliminary Design, three bridge options were investigated: a two-span, continuous, steel beam structure; a two-span, prestressed concrete box beam continuous for live load; and a two-span precast arch. The steel beam option was found to be the most cost efficient of the three. High strength, grade 345 steel was chosen over grade 250 steel in order to reduce the depth of the superstructure. The superstructure will consist of five rolled W840x359 AASHTO M270/M270M, grade 345 steel beams with a composite reinforced deck.

The existing bridge is narrow and a detour is recommended in order to demolish the existing structure and build the new structure. An existing 203-mm (eight-inch) diameter gas line is attached to the north fascia of the existing structure. A new gas line will be relocated and attached to the new structure. Existing aerial utilities will be relocated and included in duct banks in the new structure. The bridge is located in a historic district, but the bridge itself is not considered historic. The elevation view of the bridge is not highly visible to the traveling public and the change of structure type will not be noticed by traffic. Architectural treatments to the bridge parapets are proposed and are similar to the treatment on the existing parapets.

Two retaining walls approximately 65-m long are proposed to the west of the bridge to minimize impacts to the existing wetlands and drainage patterns. Short-height, cast-in-place walls on spread footings are proposed. Architectural treatments for the wall parapets will match the bridge parapet treatments.

D. Geotechnical Design

Soil exploration was complete during preliminary design. Fifteen SPT borings were taken for the project. The project is underlain by sedimentary bedrock classified as Brunswick shale and was found to vary from 1 meter to 5 meters below the ground surface. In general the soil in the area can be classified as a residual, shaly silt loam. A shallow foundation scheme is feasible for the project location. We do not anticipate intolerable total or differential settlement for the bridge or retaining wall foundations due to the presence of incompressible subsurface conditions. No impacts from acid producing soils are anticipated for this project.

An allowable soil pressure of 350 kPa shall be used for the foundation design. For the roadway, soft

ground material shall be removed and replaced in a few isolated areas. Excavated material may be utilized for embankment construction. Proposed embankment slopes shall be 2H:1V or flatter. A "Geotechnical Engineering Report" was complete in Preliminary Design and submitted to NJDOT. Refer to the report for further details.

E. Survey Parameters

Arora's subconsultant, Medina Consultants, performed the survey, base mapping, and right of way research in Preliminary Design. Air-Ography, Inc. provided the photogrammetric mapping for the project. A survey report by Medina dated 4/19/2000 was completed, reviewed by Arora and submitted to NJDOT. The horizontal control datum for this project is based on the North American Datum 1983 (NAD 83 Metric) and the Vertical Control Datum is the North American Vertical Datum of 1988 (NAVD 88 Metric).

For horizontal control, a primary control station was established and stations were observed using simultaneous GPS observations that produced the minimum accuracy standard for controlling the aerial mapping. The secondary survey control baseline was established by conventional survey methods and a preliminary transverse analysis of the secondary survey control was performed. The secondary control network was then adjusted using a simultaneous least squares adjustment program. The vertical control stations used for the project were points established by GPS derived elevations and verified by conventional differential leveling methods.

F. Traffic Engineering

There are no proposed traffic signals or permanent signing for this project. Amwell Road will be striped with a double yellow line dividing traffic and single white shoulder lines through the project limits. Beam guide rail will be required and attached to the bridge and retaining wall parapets. We do not propose any additional lighting within the project limits.

Demolishing the existing bridge and constructing the new bridge in stages is not feasible. Therefore, a detour will be required during replacement of the bridge. The proposed detour route consists of Blackpoint Road, Wertsville Road and Long Hill Road. The detour is approximately three miles long and results in an additional travel distance of less than 2.5 miles. Some roadway and intersection improvements will be required to handle bus and local truck traffic along the detour.

We have verified with Somerset County that there are no load-restricted bridges along the detour route. Because Amwell Road has heavy truck volume and acts as a shortcut between US Routes 202 and 206, signing is proposed at the intersection of Amwell Road and these highways encouraging truck traffic to find an alternate route to Amwell Road.

We have contacted the Neshanic Volunteer Fire Company regarding the detour and we anticipate little impact of the response time due to the fact that the location of the firehouse allows access to both sides of the existing bridge. The Hillsboro Rescue Squad is located on East Mountain Road, which is approximately three miles east of the bridge location. Their response times are not considerably affected by the detour. Also, school busses use Amwell Road in the vicinity of the

detour. A traffic impact study was completed during Preliminary Design and submitted to NJDOT. Improvements to the intersections along the detour will be required to accommodate local truck and bus traffic.

G. Landscape and Urban Design

The project should have little effect on the overall visual continuity and aesthetics of the area. A small number of trees will be cleared for the bridge and roadway improvements. One large 1.7-m diameter tree will be removed in the northeast corner of the existing bridge. The amount of clearing is well below the half-acre limit required for reforestation and will have no impact on wildlife. Since the project is in a bucolic, historic area, we are proposing an architectural treatment to the proposed bridge and retaining wall parapets similar to that of the existing bridge.

H. Access Design

There are five driveways that are impacted by the project. Three driveways will be constructed in the same locations with new profiles. The two driveways just east of the bridge will need to be relocated to accommodate the inlets at the proposed low point. Relocation of these driveways will also help accommodate the guide rail required to shield the proposed bridge parapets. The driveway just east of the bridge on the north side of Amwell Road provides access to an open field for the 789 Amwell Road residence only. In Final Design, we will investigate the need to maintain this access and relocate the driveway. We will meet with NJDOT and property owners to discuss proposed driveway revisions during Final Design as necessary.

H. Hydrology & Hydraulics

The preliminary drainage schemes for stormwater runoff are shown on the construction plans in this submission. Arora has strived to minimize changes to the existing drainage patterns and to minimize environmental disturbance while designing the proposed drainage scheme. Retaining walls are proposed to the west of the bridge to minimize disturbance to the wetlands and to keep the existing drainage ditches along the roadway at approximately the same location. Increase in non-pervious area is minimal on the project and we do not anticipate the need for stormwater management measures. Some slope easements will be required for the ditches of the proposed drainage schemes.

The Neshanic River is classified as a freshwater non-trout stream and discharges into the South Branch of the Raritan River. The bridge is located within the floodplain of the Neshanic and a Stream Encroachment Permit will be required. The floodplain of the Neshanic is wide in the vicinity of the bridge and extends into the Amwell Road / Montgomery Road / Black Point Road intersection. It is beyond the scope of this project to raise the profile to limit the water surface of the regulatory flood to the outside edge of shoulder. The proposed roadway profile is similar to the existing profile with some filling occurring east of the bridge. The bridge opening was designed using a HEC-RAS analysis to verify that the new structure will meet NJDEP's criteria of not affecting existing river flood levels. Soil erosion and sediment control plans will be prepared during final design to minimize impacts to water quality during construction.

J. Design Exceptions

No design exceptions will be required for this project.

K. Utility and Railroad Engineering:

During Preliminary Design the existing utilities were located and added to the base mapping. Subsurface utility test pits were taken to verify the location of the existing utilities. Six public utility companies are involved within the project limits. They include Sprint, PSE&G (gas), Verizon, RCN of NJ, Elizabethtown Water, and GPU Energy. We have worked with the utility owners to develop schemes of accommodation. During Final Design we will complete the final utility plans and utility agreements.

Our analysis of accommodation schemes indicates that we will need a construction easement along the north side of Amwell Road for the temporary relocation of utility poles during construction. Existing aerial utilities will be moved to the temporary poles during construction. These utilities will be reconstructed underground and included in duct banks on the new structure.

A 203-mm steel gas main is attached to the north fascia of the existing bridge. The bridge portion of the existing gas main will be removed and the remaining portion of the line will be capped and back fed to the properties on both sides of the bridge during construction. The proposed gas line will be carried through the new bridge structure.

A 610-mm diameter water main is located along the southerly shoulder of Amwell Road. In the vicinity of the bridge, the water main crosses the Neshanic River via a six-meter-wide permanent Elizabethtown Water Company easement. The portion of the water main and fire hydrant on the easterly side of the bridge will require relocation to allow for construction of the storm drainage and guide rail systems.

L. ROW Engineering:

The project has been designed to minimize impacts on the historic properties to the east of the bridge and the wetlands on the west side of the bridge. Our preliminary design indicates that there will be some minor acquisition of land required along the detour to improve intersections along the detour. Slope easements will be required for the project and they are shown on the preliminary ROW plan included with this submission.

M. Jurisdiction:

This project will be owned by Somerset County. As a result, the jurisdictional maps and agreements will not be required.

N. Bicycle/Pedestrian Impacts

Amwell Road is a winding, rural road that does not have existing sidewalks within project limits and is not inviting to pedestrians. Therefore, sidewalks are not proposed on the bridge or within project limits. The introduction of 2.4 m shoulders will increase safety to bicycle and pedestrian traffic within the project limits.

O. Constructibility

The bridge replacement will require a detour as discussed in prior sections of this report. Speed of construction is of utmost importance for this project to minimize the time frame of the detour. The roadway will be kept open until the start of actual bridge demolition. Existing aerial utilities will be moved to temporary pole locations during construction to allow enough room for steel erection. Demolition of the existing bridge and construction of the bridge substructures will require soil erosion and sediment control plans to mitigate potential impacts to the water quality of the Neshanic River. Cofferdams will be required to construct the spread foundations of the pier.

P. Construction Cost Estimate

The initial cost estimate has been complete using the appropriate NJDOT preliminary estimate spreadsheet. The estimated total construction cost of the project is approximately three million dollars. See the attached spreadsheet for details.

Q. Construction Schedule

The initial construction schedule is attached. The construction duration is scheduled to be approximately one year.



ARORA and ASSOCIATES, P.C.
Consulting Engineers

CATEGORICAL EXCLUSION DOCUMENT

NEW JERSEY DEPARTMENT OF TRANSPORTATION

CATEGORICAL EXCLUSION DOCUMENTATION

May 10, 2002

I. GENERAL INFORMATION

| | | | |
|-------------------------|---------------------------------|----------------------|-------------|
| DOT Job Code No. | 7223324 | Federal Project No. | NA |
| Project Management Team | Group 1 Lynn Rich | Data Base No. | I002 |
| Route and Section | CR 514 | Structure No. | B0507 |
| Local Road Name | Amwell Road over Neshanic River | | |
| Municipality | Hillsboro Township | County | Somerset |
| Type of Project | Bridge Replacement | Length | 800 meters |
| From | N/A | To | N/A |
| Congressional District | NJ 7 | Legislative District | 16 |
| ROW Cost | 0.300 million | Construction Cost | 2.5 million |

| EXISTING FACILITY | PROPOSED FACILITY |
|--------------------------------|--------------------------------|
| ROW Width 20.11m | ROW Width 20.11m |
| No. of Lanes & Width 2-3.6m | No. of Lanes & Width 2-3.6m |
| Shoulder Width 0.5m Median N/A | Shoulder Width 2.4m Median N/A |
| Overall Roadway Width 7.3m | Overall Roadway Width 12m |

II. PROJECT DESCRIPTION (Attach location map)

A. Project Need (briefly explain why the project is needed)

The existing bridge is structurally deficient and has a sufficiency rating below 15. The vertical and horizontal alignments of the bridge approaches are also substandard.

B. Proposed Improvements (provide a brief description of proposed improvements)

This project seeks to replace the existing Amwell Road (County Route 514) bridge, (Structure No. B0507), over the Neshanic River. The bridge and roadway approaches will be widened to provide two 3.6m lanes and 2.4m shoulders in each direction. The roadway approaches will also be realigned to provide adequate sight distance. There will be a 2.1 mile detour for the duration of the project to facilitate construction.

C. Right of Way Taking

Total area needed: 0 est. number of parcels: in fee- 0 easements- 2
 Est. number of relocations: residences-0 businesses- 0 parking spaces- 0
 Community facilities affected: 0
 Area (hectares) of public recreational land taken: 0 out of a total area of

III. ENVIRONMENTAL CONSIDERATIONS:

A. Noise

- ☒ Sensitive receptors within 65 meters for two lanes or 130 meters for four lanes.
☐ Project substantially changes the vertical or horizontal alignment of the roadway.
☐ Traffic volumes or speeds substantially increase.

Conclusion:

- ☒ Noise study not required. No significant impact anticipated.
☐ Potential noise impacts were studied and are discussed in comments. Project still meets CE criteria.

Comments:

This bridge replacement will not significantly change noise levels in the area.

B. Air Quality: CONFORMITY WITH THE CLEAN AIR ACT AMENDMENTS (CAAA) OF 1990

Section 1: Regional Emissions Analysis (STIP or MPO's conforming transportation plan).

- ☒ This project is included in the FY 2001 - 2003 approved State Transportation Improvement Plan (STIP).
This project is not listed in the FY 200_ - 200_ approved STIP, but is included in the MPO's conforming transportation plan.
☐ This project is not included in either the approved STIP or the MPO's conforming transportation plan.

Section 2: Based on its scope, the project is categorized by the Transportation Conformity Rule (TCR) as:

- A project type listed in **Table 2** of the TCR, i.e. **Exempted** from the conformity requirements of the CAAA (i.e. exempted from regional emissions analysis and Carbon Monoxide (CO) analysis requirement) and may proceed toward implementation even in the absence of a conforming transportation plan and TIP.
☒ A project type listed in **Table 3** of the TCR, i.e. **Exempted** from regional emissions analysis requirement, but local effects of this project with respect to CO concentrations must be considered to determine if a hot-spot analysis is required. Complete **Section a** below.
☐ A project type not listed in either **Table 2** or **Table 3** of the TCR, i.e. must be a part of a conforming STIP and/or a MPO's conforming transportation plan and requires a CO hot-spot analysis. Complete **Section b** below.

Section a: Project type listed in Table 3 of the TCR

- Project located in **CO Attainment area**. CO analysis not required – project may proceed to the project development process.
☐ The total eight-hour Carbon Monoxide levels are expected to be reasonably below the NAAQS of 9 ppm. This is based on LOS data for the intersection(s) and the total highest traffic volumes at this (those) intersection(s) and the distance of the sensitive receptors to the roadway. No quantitative analysis required – project may proceed to the project development process even in the absence of a conforming transportation plan and TIP.
☐ Project located in a Carbon Monoxide **Non-Attainment/Maintenance area** and requires a Carbon Monoxide hot-spot analysis. A CO Analysis was completed at the following intersections:
☐ and the results are:

Section b: Project type listed in neither Table 2 nor Table 3 of the TCR

- ☐ Carbon Monoxide hot-spot (Quantitative/Qualitative) analysis was performed at the following locations:
☐ and the results are:

Comments:

The project involves replacement of existing bridge over Neshanic River. It does not impact regional emissions.

C. Ecology & Permits (briefly describe any potential impact(s) under comments)

| | |
|---------------------------------------------------|------------------------------------------------------------|
| <input checked="" type="checkbox"/> Water Quality | <input type="checkbox"/> Sole Source Aquifer |
| <input checked="" type="checkbox"/> Floodplain | <input type="checkbox"/> Unique/Endangered Species Habitat |
| <input checked="" type="checkbox"/> Wetlands | <input type="checkbox"/> Wildlife |
| <input type="checkbox"/> Acid Soils | <input type="checkbox"/> Forested Areas |

Conclusion:

- ☐ No significant impact anticipated.
☒ Further studies needed to obtain permits. Project still satisfies CE criteria. (see comments)

Comments:

Wetlands have been located within the project location. Minor impacts to wetland areas within the right of way are anticipated. The bridge is located within the 100-year floodplain of the Neshanic River and the project will comply with the 20% net fill rule.

D. Environmental Permits/Coordination Needed:

| | | | |
|-------------------------------------|---|-----------------------------------|---|
| U.S. Coast Guard (Bridge) | | NJDEP Waterfront Development | |
| USACOE Section 404 (Individual) | | NJDEP Stream Encroachment - Major | X |
| USACOE Section 404 (Nationwide) | | NJDEP Stream Encroachment - Minor | |
| USACOE Sec. 10 (Navigable Waters) | | NJDEP Riparian | |
| CAFRA | | NJDEP Water Quality Certificate | X |
| NJDEP Remediation Approval | | USEPA - Sole Source Aquifer | |
| NJDEP Coastal Wetlands | | Delaware Basin Commission | |
| NJDEP Freshwater Wetlands - GP | X | D & R Canal Commission | |
| NJDEP Freshwater Wetlands - IP | | Meadowlands Commission | |
| NJDEP Pollutant Discharge | | Pinelands Commission | |
| EO 11990 Wetlands | X | EO 11988 Floodplain | X |
| P. L. 2001 Chapter 10 Reforestation | | Essential Fish Habitat | |

Comments: (potential impacts, unique features, sensitive issues)

Currently a NJDEP Freshwater Wetlands General Permit #7 is anticipated for impacts to drainage swales, a GP #10 for minor road crossings, and a GP #11 for outfalls to the Neshanic River. If further investigation reveals impacts to exceed one acre, then an individual permit will be necessary. A NJDEP Stream Encroachment Permit (Major) will be required for a road crossing.

E. Cultural Resources**Technical Findings:**

- ☐ No Effect per FHWA/SHPO Agreement of 07-06-00; subject to conditions identified in the Agreement
☐ No NR listed/eligible properties in APE (Section 106 Findings = No Historic Properties Affected)
☒ NR listed/eligible properties in APE (see summary table below)

| Archaeology | Architecture | | | | Sec. 106 Finding |
|-------------|--------------|----------|----------|-------|------------------------------------------------------------|
| | Bridge | Building | District | Other | |
| | | | | | NR listed/elig. property - No Historic Properties Affected |
| X | | X | | | NR listed/elig. property - No Adverse Effect (NAE) |
| | | | | | NR listed/elig. property - NAE with conditions |
| | | | | | NR listed/elig. property - Adverse Effect |

Conclusion: Consultation Summary (indicate date of concurrence/approval)

- ☐ FHWA concurred with Adverse Effect Finding on
☒ SHPO provided Section 106 consultation comments on
☐ FHWA concurred with No Adverse Effect with Conditions on
☐ ACHP notified of Adverse Effects on

3/25/02

- ☐ ACHP responded to notification on _____
- ☐ ACHP will participate in consultation _____
- ☐ ACHP declined to participate in consultation _____
- ☐ MOA executed by FHWA on _____
- ☐ MOA filed with ACHP on (OR) _____
- ☐ ACHP accepted/signed MOA on _____

Comments:

SHPO concurred that 558 Montgomery-Black Point Road, 810 Amwell Road, and the Suydam/Hall Workshop (28-So-129) are eligible for listing in the National Register of Historic Places. SHPO concurred with the findings of "No Historic Properties Adversely Affected" in regards to these three eligible properties that lie within the area of potential effects. The archaeological site is located within NJDOT's right of way, however, it will only be covered by fill as it is within the toe of slope after the proposed improvements.

F. Sec. 4(f) Involvement - Historic Sites

- ☐ Project results in a use of Historic site(s) on or eligible for the National Register of Historic Places.
- ☐ Project results in a "**constructive use**" of Section 4(f) property.

Conclusion:

- ☒ No Section 4(f) Involvement
- ☐ Section 4(f) Involvement. Project falls under the **Programmatic Nationwide Section 4(f) Evaluation** and all applicability criteria have been met including agreement of the SHPO with the "**No Effect**" recommendation.
- ☐ Section 4(f) Involvement. Project is a **Programmatic Nationwide Section 4(f) Evaluation** and all applicability standards have been met including agreement by the ACHP with the "**No Adverse Effect**".
- ☐ Section 4(f) Involvement. Project is covered under the **Programmatic Nationwide Section 4(f) Evaluation** for Historic Bridges.
- ☐ Section 4(f) Involvement. Project has an "**Adverse Effect**". Individual Section 4(f) prepared.

Documentation: If Section 4(f) impacts exist - refer to Appendix for FHWA approved documentation.

Comments:

The project does not involve right of way acquisition from historic properties.

G. Sec. 4(f) Involvement - Recreational Land

- ☐ Project requires acquisition from Publicly-owned recreation land.
- ☐ Project results in a "Constructive Use" of Section 4(f) property.
- If either of the above are checked, fill out the following:

Site (use local name):

Lot and Block #:

Total Hectares To Be Acquired (consider acquisition and easement) _____

Total Hectares of Park: _____ Amount of Parkland affected: _____

☐ Federal DOI Section 6(f) regulations or other Federal encumbrances involved.

Conclusion:

- ☐ No Section 4(f) Involvement.
- ☐ Section 4(f) Involvement. Project falls under **Temporary Occupancy**; all applicability criteria and conditions have been met (Explain below).
- ☐ Section 4(f) Involvement. Project falls under the **Programmatic Nationwide Section 4(f) Evaluation**; all applicability criteria and conditions have been met.
- ☐ Section 4(f) Involvement. **Individual Section 4(f) Evaluation** was completed, but **no significant impacts are anticipated**.
- ☒ No Section 4(f) Involvement, but any changes made to the project which require use of Section 4(f) land would

___ require compliance with Section 4(f).

Documentation: If Section 4(f) impacts exist - refer to Appendix for FHWA approved documentation.

Comments:

The project does not involve right of way acquisition from recreational land. However, there is a 4(f) property in the vicinity of the project that will be affected if there is a significant change in the project scope.

H. Hazardous Materials and Landfills

___ Involvement with known or suspected contaminated site. (If so, explain under comments)

___ Involvement with underground storage tanks. (If so, explain under comments)

Conclusion:

☒ Low potential for involvement with contamination, no further investigation required.

___ Further investigation and/or sampling required to determine extent of involvement with contamination. Project still meets FHWA criteria for a CE.

Comments:

Based on field investigation and associated research, this project has a low potential for involvement with hazardous waste or contamination issues. Data collected revealed that there are no environmentally sensitive parcels in the project area from a hazardous waste perspective.

I. Socioeconomic Areas

☒ The project will not result in significant socioeconomic impacts.

Comments:

This project will not involve relocations or the purchase of right of way.

J. Environmental Justice

☒ Project will have **no** disproportionately high or adverse effects on low income and or minority communities

___ Project will have disproportionately high and adverse effects on low income and or minority communities

Conclusion:

☒ Project is in compliance with the goals of Executive Order 12898 and the requirements of the Civil Rights Act of 1964.

___ Project is in compliance with the goals of Executive Order 12898 and the requirements of the Civil Rights Act of 1964, through the identification of measures to address disproportionate effects, including actions to avoid or mitigate them. Project satisfies CE criteria.

Comments:

Since the project, as proposed, will not displace any residences or businesses or affect any community facilities, the only impact to the neighborhood will be the disruption of traffic during construction. However, a detour will be provided during construction. This impact will be temporary during construction and will not be borne by any one population. No impacts will be concentrated on minority or low income populations.

K. Public Reaction (briefly describe input from the Office of Community Relations or current status of public reaction)

In a letter dated July 5, 2002 Somerset County reaffirmed their support of this project and requested that it get top priority due to the serious condition of this bridge (sufficiency rating below 15 out of 100).

L. Environmental Commitments (list if any)

Unimpacted wetlands and transition areas within the project area will be protected from encroachment by silt fence and plastic orange snow fence.

Permit conditions will be incorporated in the construction plans.

DETERMINATION OF CATEGORICAL EXCLUSION

Project name and location: Amwell Road over Neshanic River, Bridge Replacement
Hillsboro Township, Somerset County

CE #: 23CFR 771.117(d)(3)

The proposed project satisfies the Categorical Exclusion definition outlined in 23 CFR 771.117(a) and will not result in significant environmental impacts.

Ryan D. Middleton
Project Manager, Division of Project Management

8/5/02
Date

Recommended:

Joseph A. Swezy
Environmental Team Leader

5 Aug 2002
Date

Certified

☐

Approved

☒

Jack P. L. O'Connell
Manager, Bureau of Environmental Services

8-6-02
Date

Concurrence

(only needed for
CEs not certified
by BES Manager)

James L. Smith
(FOR) - Division Administrator
Federal Highway Administration

8/14/02
Date



ARORA and ASSOCIATES, P.C.
Consulting Engineers

PRELIMINARY CONSTRUCTION COST ESTIMATE

Classification Number 2 - RECONSTRUCTION, WIDENING & DUALIZATION

| | | | |
|-------|----------------|--------------------|--|
| Route | CR514 | Section/Contract # | |
| PM | Lynn Middleton | UPC No. | |

EARTHWORK (must be calculated)

| | Unit | Quantity | x Unit Price | Amount |
|-----------------------------------------------|----------|----------|--------------|---------------|
| Stripping (100-150mm Depth) | Hectare | | 10,000 | 0 |
| Roadway Exc. Unclassified | C.M. | 1500 | 16 | 24,000 |
| Removal of Conc. Base & Conc. Surface Courses | S.M. | | 18 | 0 |
| Channel Excavation | C.M. | | 17.5 | 0 |
| Ditch Excavation | C.M. | 300 | 16 | 4,800 |
| Borrow Excavation Zone 3 | C.M. | 1150 | 16 | 18,400 |
| EARTHWORK TOTAL | = | | | 47,200 |

Suggested procedure for calculating earthwork:

- Determine Typical section (number of lanes, median widths, side slopes, etc.).
- Get latest topography map available.
- Plot proposed alignment on topo map.
- Develop profile using topo controls such as existing roads, streams, rivers and design manual.
- Calculate Areas for the typical section in 0.3 meter increments of cut or fill.
- At 30 to 150 meter intervals (depending on frequency of X-section changes) calculate the earthwork.
- Calculate any other significant earthwork (ramps, cross-roads, etc.).
- Make appropriate earthwork corrections for the pavement box and striping. Use 530 mm depth for rigid pavement, 660 mm depth for all flexible pavement and 100 mm depth for stripping.
- Deduct any roadway excavation from borrow required to calculate Borrow Excavation Zone 3.
- See Construction Cost Estimate Work Sheet (Section 3.1). This worksheet must be utilized for the most recent price information.

PAVEMENT

3.6 M WIDE LANE (from subgrade up)

| Pav't. Type | Description of Pavement | Cost/Linear Meter |
|-------------|----------------------------------------|-------------------|
| A | 250 mm R.C. Pavement | 510 |
| B | 50 mm HMA Surf. Crs. & 200 mm HMA Base | 200 |
| C | 75 mm HMA Surf. Crs. & 100 mm HMA Base | 150 |
| D | 50 mm HMA Surf. Crs. & 50 mm HMA Base | 70 |
| E | Bridge Approach & Transition Slabs | 510 |
| | (Resurfacing Portion only F & G) | |
| F | 50 mm HMA Surface Course | 27 |
| G | 75 mm HMA Surface Course | 40 |
| H | Milling 50 mm | 10 |

Class 2 - Reconstruction, Widening Dualization

| | | |
|-------|----------------|--------------------|
| Route | CR514 | Section/Contract # |
| PM | Lynn Middleton | UPC No. |

Computation Table for Pavement. Cost

| Type | Cost from table above | x Length | x Pavement *W.F. | = Amount |
|----------------|-----------------------|----------|------------------|-----------|
| B | 200 | 290 | 3.33 | 193,333 |
| PAVEMENT TOTAL | | | | = 193,333 |

*Width Factors = Ratio of 3.6 meter wide lane to actual pavement width.

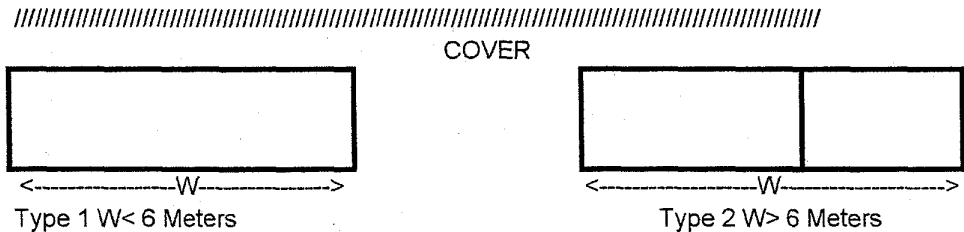
Example = actual pavement width = 7.5 meters = $7.5/3.6 = 2.05$ W.F.

CONTEXT SENSITIVE DESIGN

Attach additional sheet detailing items and costs of context sensitive design work

=

CULVERTS



| Type | Layout (3) | Skew (1) | Cover (2) | Cost Per Sq. Meter |
|--------|---------------------------------------------------------|--------------|-----------|--------------------|
| Type 1 | Area w x L exceeds 93 Sq. Meters | 0-60 degrees | 0 to 3 M | 1,235 |
| | | | 3 to 6 M | 1,585 |
| | Short Culverts Difficult Conditions under 93 Sq. Meters | 0-60 degrees | 0 to 3 M | 2,190 |
| | | | 3 to 6 M | 2,530 |
| Type 2 | Area w x L exceeds 93 Sq. Meters | 0-60 degrees | 0 to 3 M | 1,310 |
| | | | 3 to 6 M | 1,640 |
| | Short Culverts Difficult Conditions under 93 Sq. Meters | 0-60 degrees | 0 to 3 M | 2,190 |
| | | | 3 to 6 M | 2,530 |

For skews over 60 degrees it will be necessary to make a special analysis and establish a square meter price comparable to above.

| Description | Area Computation | x Cost per Sq. Meter | = Amount |
|-----------------|------------------|----------------------|----------|
| | | | 0 |
| | | | 0 |
| | | | 0 |
| | | | 0 |
| Culvert Total = | | | 0 |

Class 2 - Reconstruction, Widening Dualization

| | | |
|-------|----------------|--------------------|
| Route | CR514 | Section/Contract # |
| PM | Lynn Middleton | UPC No. |

BRIDGES

For the Bridge Sketch see the Construction Cost Estimation Preparation Manual

1 to 3 spans and 2 side spans (Max. Span 30.5 meters)

H = Clear Height 4.4 To 7.0 meters (4)

L = 30.5 to 122 meters & all viaducts over 122 meters (5)

| Class | Layout | Skew (1) | Foundation (2) | Cost per Sq. Meter |
|-------|-------------------------------|---------------------|---------------------|--------------------|
| I | Width at Least 13.7 meters | 0 to 40 Degrees | No Piles | 1,450 |
| | | | Piles at Stub Abut. | 1,720 |
| | | | Piles at Piers & St | 1,880 |
| | | 40 to 60 Degrees | No Piles | 1,560 |
| | | | Piles at Stub Abut. | 1,810 |
| | | | Piles at Piers & St | 1,950 |

For the Bridge Sketch see the Construction Cost Estimation Preparation Manual

1 to 3 spans and 2 side spans (Max. Span 30.5 meters) (3)

H = Clear Height 4.4 meters (4)

L = under 122 meters

| Class | Layout | Skew (1) | Foundation (2) | Cost per Sq. Meter |
|-------|------------------------------------------------------------------|----------|----------------|--------------------|
| II | L exceeds W Area L x W exceeds 418 Sq. Meters | 0 to 40 | No Piles | 1,900 |
| | | Degrees | On Piles | 2,015 |
| | | 40 to 60 | No Piles | 2,365 |
| | | Degrees | On Piles | 2,940 |
| III | W exceeds L Area L x W exceeds 418 Sq. Meters | 0 to 40 | No Piles | 2,440 |
| | | Degrees | On Piles | 3,220 |
| | | 40 to 60 | No Piles | 2,600 |
| | | Degrees | On Piles | 3,335 |
| IV | Width 9.1 - 13.7 meters Area W x L under 418 Sq. Meters | 0 to 40 | No Piles | 3,180 |
| | | Degrees | On Piles | 4,270 |
| | | 40 to 60 | No Piles | 3,425 |
| | | Degrees | On Piles | 4,480 |

For the Bridge Sketch see the Construction Cost Estimation Preparation Manual

1 to 2 spans (Max. Span 38 meters)

H = Clear Height 4.4 To 7.0 meters (4)

L = 30.5 to 76 meters

| Layout | Skew (1) | Foundation (2) | Cost per S.M. |
|-------------------------------|---------------------|----------------------------------|---------------|
| Width at Least 12 meters | 0 to 40 Degrees | No Piles | 1,690 |
| | | Piles at Semi-Stub Abut. | 1,960 |
| | | Piles at Piers & Semi-Stub Abut. | 2,200 |
| Minimum Length 30.5 Meters | 40 to 60 Degrees | No Piles | 1,790 |
| | | Piles at Semi-Stub Abut. | 2,095 |
| | | Piles at Piers & Semi-Stub Abut. | 2,340 |
| | | | 0 |

Length

Width

Cost per SM

Bridge Total

Class 2 - Reconstruction, Widening Dualization

| | | |
|-------|----------------|--------------------|
| Route | CR514 | Section/Contract # |
| PM | Lynn Middleton | UPC No. |

1. For skews over 60 degrees it will be necessary to make a special analysis and establish a square meter price comparable to above.
2. For very bad foundation conditions requiring unusual lengths or spacing of piles, it will be necessary to establish a square meter price.
3. For longer spans, adjust the cost per square meter to reflect increased cost of structural members.
4. For span bridges, it is expected the length of the side span will be increased in proportion to any increase in height. Because of the resultant increase in deck area, the square meter price will remain approximately the same in the range of heights shown. For extremely high structures (particularly for viaducts), square meter prices will have to be increased.
5. For structures over 122 meters long (viaducts), reduce the cost per square meter if repetitive span length and forming can be used. Reduce by \$5.00 for lengths from 122 to 180 meters and by \$10.00 for lengths over 180 meters. (Do not forget adjustments (3) and (4) above on viaducts).
6. For statically indeterminate structures, square meter prices will have to be established.

| Structure Description | Calculated Sq. Meter of Bridge Deck or Retaining Wall Face | x Cost Per Square Meter | = Amount |
|-----------------------------------------|------------------------------------------------------------|-------------------------|-----------|
| Bridge | 510 | 1,690 | 861,900 |
| NW Retaining wall | 213 | 850 | 181,050 |
| SW Retaining wall | 144 | 850 | 122,400 |
| Sub Total | | | 1,165,350 |
| Clearing Site Bridge *0-3% of Sub Total | % | 0.1 | 116,535 |

BRIDGE TOTAL **1,281,885**

*Pick appropriate percent based on the size, type and materials of existing structure

DRAINAGE (includes inlets and cross drains)

| | | | |
|---------------------|------|-------------------------------|--------|
| Rural | 0.29 | 226,400 | 65,656 |
| project length (KM) | | x cost per kilometer = Amount | |
| Urban | | 338,200 | 0 |
| project length (KM) | | x cost per kilometer = Amount | |

The above are the total costs of basins, manholes, longitudinal and transverse pipes, underdrains, headwalls, protecting curbs, aprons, etc. for a divided highway with a depressed median. The costs are assumed to apply to 4, 6 or 8 lane sections since there will be no appreciable difference in the number of basins or the sizes or lengths of pipes.

Frontage Road & Ramp Drainage

| | | |
|------------------------------------------|------------------|---------------|
| | 180 | 0 |
| length of ramp or frontage rd. in meters | x cost per meter | = Amount |
| DRAINAGE TOTAL | | 65,656 |

Class 2 - Reconstruction, Widening Dualization

| | | | |
|-------|----------------|--------------------|--|
| Route | CR514 | Section/Contract # | |
| PM | Lynn Middleton | UPC No. | |

INCIDENTAL ITEMS

| Item | Cost / L.M. | x Quantity | = Amount |
|--------------------------------|-------------|------------|----------|
| Beam Guide Rail | | 55 | 130 |
| Fence 1.8 Meter High | | 60 | |
| 225 mm X 400 mm Conc. Vertical | | 45 | |
| 375mm X 1040 mm Conc. Barrier | | 165 | |
| 600mm X 1040 mm Conc. Barrier | | 240 | |
| 600mm X Variable Conc. Barrier | | 150 | |
| Sign Bridge | 308,000 | | |
| Cantilever Sign Structure | 60,500 | | |
| INCIDENTAL ITEMS TOTAL | = | | 7,150 |

LANDSCAPE

| | Quantity | x Unit Prices | = Amount |
|------------------------------------------|----------|---------------|----------|
| Topsoil and Seeding (Mainline) | | | |
| Length of Project in kilometers | 0.29 | 70,100 | 20,329 |
| Planting (Mainline) | | | |
| Length of Project in kilometers | 0.29 | 40,000 | 11,600 |
| Topsoil, Seeding, Planting (Finger Ramp) | | | |
| Number of Finger Ramps | | 12,500 | 0 |
| Topsoil, Seeding, Planting (Loop Ramp) | | | |
| Number of Loop Ramps | | 20,000 | 0 |
| Topsoil, Seeding (Access Road) | | | |
| Length of Access Road in Meters | | 26 | 0 |
| LANDSCAPE TOTAL | = | | 31,929 |

NOISE ABATEMENT

| | Unit | Quantity | x Cost | = Amount |
|-----------------------|------|----------|--------|----------|
| Noise Wall | L.M. | | 1,000 | 0 |
| | | | | 0 |
| | | | | 0 |
| | | | | 0 |
| NOISE ABATEMENT TOTAL | = | | | 0 |

GENERAL ITEMS

| Item | Project Length (Km) | x Cost/KM | = Amount |
|-----------------------------------|---------------------|-----------|----------|
| Field Office | 0.29 | 27,500 | 7,975 |
| Materials Field Laboratory | 0.29 | 18,000 | 5,220 |
| Erosion Control during Constructi | 0.29 | 40,000 | 11,600 |
| GENERAL ITEMS TOTAL | = | | 24,795 |

Class 2 - Reconstruction, Widening Dualization

| | | | |
|-------|----------------|--------------------|--|
| Route | CR514 | Section/Contract # | |
| PM | Lynn Middleton | UPC No. | |

SUMMARY

| Work Type | Totals from other pages |
|--------------------------|-------------------------|
| Earthwork | 47,200 |
| Pavement | 193,333 |
| Context Sensitive Design | 0 |
| Culverts | 0 |
| Bridges | 1,281,885 |
| Drainage | 65,656 |
| Incidental Items | 7,150 |
| Landscape | 31,929 |
| Noise Abatement | 0 |
| General Items | 24,795 |
| PROJECT SUBTOTAL | 1,651,948 |

| Other Items | Proj. Subtotal Range | Choice | Amount | |
|--------------------------------------------------|---------------------------|-----------------------|---------|---------|
| Lighting, Traffic Stripes, Signs and Delineators | | 3% of Proj. Subtotal | 49,558 | |
| Maintenance of Traffic | | 7% of Proj. Subtotal | 115,636 | |
| Training | | 1% of Proj. Subtotal | 16,519 | |
| Mobilization | | | 148,675 | |
| | Project Cost < 5.0 (Mil.) | 9% of Proj. Subtotal | | 148,675 |
| | Project Cost 5.0 & above | 10% of Proj. Subtotal | | 0 |
| Progress Schedule | Project Cost (Mil.) | \$ | 0 | |
| | Less than 2.0 | 0 | | 0 |
| | 2.0 to 5.0 | 6,000 | | 0 |
| | 5.0 to 10.0 | 8,000 | | 0 |
| | 10.0 to 20.0 | 15,000 | | 0 |
| | 20.0 to 30.0 | 30,000 | | 0 |
| | 30.0 to 40.0 | 40,000 | | 0 |
| | 40.0 & above | 58,000 | | 0 |
| Clearing Site | Project Cost (Mil.) | \$ | 30,000 | |
| | Less than 1.0 | 15,000 | | 0 |
| | 1.0 to 2.0 | 30,000 | | 30,000 |
| | 2.0 to 5.0 | 45,000 | | 0 |
| | 5.0 to 10.0 | 115,000 | | 0 |
| | 10.0 to 20.0 | 220,000 | | 0 |
| | 20.0 to 30.0 | 240,000 | | 0 |
| | 30.0 to 40.0 | 250,000 | | 0 |
| | 40.0 & above | 490,000 | | 0 |

Class 2 - Reconstruction, Widening Dualization

| | | |
|-------|----------------|--------------------|
| Route | CR514 | Section/Contract # |
| PM | Lynn Middleton | UPC No. |

| | | | | |
|---------------------|--------------------|---------|-----------|--------|
| Construction Layout | Project Cost(Mil.) | \$ | 20,000 | |
| | Less than 1.0 | 7,000 | | 0 |
| | 1.0 to 2.0 | 20,000 | | 20,000 |
| | 2.0 to 5.0 | 42,000 | | 0 |
| | 5.0 to 10.0 | 87,000 | | 0 |
| | 10.0 to 20.0 | 160,000 | | 0 |
| | 20.0 to 30.0 | 220,000 | | 0 |
| | 30.0 to 40.0 | 490,000 | | 0 |
| | 40.0 & above | 890,000 | | 0 |
| | PROJECT TOTAL | | 2,032,338 | |

CONTINGENCIES & ESCALATION

Y = Number of Years until midpoint of construction duration plus number of years until construction start. If midpoint is less than 2 years from the date of this estimate, no escalation is required. Maximum value = 10%

| |
|------|
| Y |
| 3.00 |

3.00

| | | | |
|---------------|---------------------|--------------------------|-----------------------------------|
| 2,032,338 | 1.030 | 1.04 | 2,177,040 |
| Project Total | Contingencies (1+C) | $1 + [0.01 (Y+1) (Y-2)]$ | Construction Estimate for Initial |

| Project Cost(Mil.) | Contingencies (C) Percent | Average Construction Duration in Years | |
|--------------------|---------------------------|----------------------------------------|-------|
| 0-10 | 3% | 1 | 0.030 |
| 10-20 | 2.50% | 2 | 0.000 |
| Over 20 | 2% | 3 | 0.000 |

CONSTRUCTION ENGINEERING (CE)

| Project Cost (Mil.) | % of Construction Cost | |
|---------------------------------|------------------------|---------|
| Less than 1.0 | 31.10% | 0 |
| 1.0 to 5.0 | 20.30% | 441,939 |
| 5.0 to 10.0 | 16.20% | 0 |
| 10.0 & above | 12.20% | 0 |
| CONSTRUCTION ENGINEERING AMOUNT | 441,939 | |

CONSTRUCTION CHANGE ORDER CONTINGENCIES

| | | |
|----------------------------------------------------------------|--------------------------------------------------------------------|--------|
| Total Federal Participating Items in Millions of \$ | Construction Change Order Contingency Amount | |
| \$0 to 0.1 | \$6,000 | 0 |
| 0.1 to 0.5 | 25,000 | 0 |
| 0.5 to 5.0 | 25,000 + 4% of amount in excess of \$500,000 | 92,100 |
| 5.0 to 10.0 | 205,000 + 3% of amount in excess of \$5,000,000 | 0 |
| 10.0 to 15.0 | 355,000 + 2% of amount in excess of \$10,000,000 | 0 |
| 15.0 and above | 455,000 + 1.5% of amount in excess of \$15,000,000 - max \$500,000 | 0 |
| For State Funded Projects, Contingencies for Change orders = 0 | | |
| CHANGE ORDER CONTINGENCY AMOUNT | = | 92,100 |

| | | |
|-------|----------------|--------------------|
| Route | CR514 | Section/Contract # |
| PM | Lynn Middleton | UPC No. |

UTILITIES RELOCATIONS BY COMPANIES/OWNERS

| | | |
|-----------|------|---------|
| 2,177,040 | 0.09 | 195,934 |
|-----------|------|---------|

for Urban use 0.12, Rural

0.055 or + Estimate

=

Utility Relocation

Construction Cost for Initial
EstimateUse % or utilities detailed
estimateCost for Initial
Estimate

If there are no utility relocations on the project indicate "No Utilities" in the box above.

RIGHT OF WAY COST

50,000

If there is no ROW cost on the project indicate "No ROW" the box

SUMMARY

| | |
|-----------------------------------|------------------|
| Construction Estimate for Initial | 2,177,040 |
| Construction Engineering (CE) | 441,939 |
| Contingencies | 92,100 |
| Utilities Relocations | 195,934 |
| Total Construction Cost | 2,907,013 |

| | |
|-------------------|--------|
| Right of Way Cost | 50,000 |
|-------------------|--------|



PRELIMINARY CONSTRUCTION SCHEDULE

